THE JOHN MUIR PROJECT of EARTH ISLAND INSTITUTE

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5/6/11

John Gerritsma, Field Manager
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BLM

Dear John,

On behalf of the John Muir Project of Earth Island Institute I am submitting the following comments on the scoping notice (SN) for the proposed "Pilot Joe Timber Sale" ("Project"). I have a Ph.D. in Ecology from UC Davis with a research focus on forest and fire ecology in Sierra Nevada forests. I offer the following comments in the hope of facilitating management based upon sound science and ecology:

General Comments, Range of Alternatives

We either actively support, or do not oppose, some aspects of this proposed project, including the prescribed burning. ***However***, we do oppose the proposed removal of mature/old trees up to 30 inches in diameter on about 600 acres of natural forest. Also, as we discuss below, given that removal of trees over about 10 inches in diameter is unnecessary in order to effectively reduce the potential for high-intensity fire (if and where that may be a scientifically defensible goal) the scoping notice does not provide a clear explanation as to why larger, older trees (e.g., those 16-20" dbh, and those 20-30" dbh) must be removed. There is no ecologically defensible evidence to indicate that the forests have too many large snags for the many wildlife species that need high levels of large snag density. Nor is there any ecologically credible reason as to why the forest ecosystem, and the native wildlife species, would be better off if these mature trees are cut and placed on the bed of a log truck, as opposed to remaining in the forest ecosystem to provide habitat as mature live trees, large snags, and/or large downed logs.

In light of this, and the information presented below, please fully consider:

- an alternative that would involve only mixed-intensity prescribed fire, and no thinning
- an alternative with a 16-inch diameter limit on the roughly 600 acres of natural forest proposed for thinning;
- an alternative in which, within the roughly 600 acres of natural forest proposed for thinning, instead of the live trees over 16" dbh being removed, the trees that would otherwise be marked for removal would instead be girdled or killed in some other way in order to actively recruit more large snags for wildlife, or such trees would be felled to provide large downed log structure for small mammals, amphibians, and invertebrates.

Additional cost of such alternatives, as compared to the Proposed Action, is not a reasonable or legally-defensible reason for dismissing a proposed alternative from full and detailed analysis and consideration under NEPA. Using such a rationale to dismiss less intensive alternatives from detailed consideration, and stating or implying as a de facto purpose and need that the alternative must maximize commercial revenue or remove a certain amount of commercial timber in accordance with the economic views of Jerry Franklin and Norm Johnson, is tantamount to the arbitrary narrowing of the purpose and need to the Proposed Action, which NEPA does not allow.

Significant Scientific Inaccuracies and Omissions in the Franklin and Johnson (2009) Report

The Franklin and Johnson (2009) unpublished report made some fundamentally inaccurate assumptions about: a) current snag densities (assuming high levels that threaten ecological integrity); b) current rates and trends of high-intensity fire in general, and with regard to Spotted Owl habitat in particular (assuming high and increasing rates, which are resulting in a decline in Owl habitat); and c) historic high-intensity fire in conifer dry forests (assuming that it was generally unnatural and did not occur). These assumptions were directly contradicted by very well-known studies available at the time that Franklin and Johnson (2009) was released, but were not mentioned in Franklin and Johnson (2009). For example, Christensen et al. (2008) and Donnegan et al. (2008) found, based upon thousands of fixed plots established by the federal government, that there is a pervasive deficit of large snags in conifer forests of OR and CA relative to minimum levels needed by many wildlife species, and that this deficit is the worst in the dry forest types. Hanson et al. (2009, 2010) found that old forest growth rates are greatly outpacing the rate of high-intensity fire in old forest currently in the dry forests of the Northwest Forest Plan area, and that fire intensity is not increasing (**see also attached comments by Hanson et al. on the Draft Northern Spotted Owl Recovery Plan, which is incorporated by reference into these comments, and as part of these comments**). Hessburg et al. (2007) found that high-intensity and mixed-intensity fire, rather than frequent low-intensity fire, were the primary influences in the pre-management fire regimes of the eastern Cascades, and that open, park-like structure was not predominant (see more on this below).

Moreover, while the Franklin and Johnson (2009) report proposes removal of a certain amount of commercial timber, this appears to be solely about economics and multiple-use, not ecology. Nowhere does the Franklin and Johnson (2009) report provide any ecological rationale as to why a medium or large stump is more ecologically valuable in the forest than a medium or large snag or downed log—i.e., they do not explain why the trees they propose for removal would not benefit the forest ecosystem more if they were turned into snags or downed logs (as Donnegan et al. 2008 propose), as opposed to stumps.

Inadequate Analysis of Ecological Impacts of Mature Tree Removal

The SN fails to explain why removal of mature trees 20-30" dbh, as opposed to turning such trees into snags or downed logs, would be beneficial ecologically; nor does the SN cite any studies, including the Franklin and Johnson (2009) report, which provide any citation to any published, peer-reviewed scientific study which recommends creation of large stumps rather than large snags or logs or explains why large stumps are more ecologically important than large snags or logs.

Misuse of the Term "Resilience"

The SN misuses and misrepresents the concept of ecological forest health as it pertains to ecosystem resilience. Under the international Convention on Biological Diversity, the United Nations Environment Programme (UNEP) describes a distinct difference between "engineering resilience" and "ecological resilience". The former is based upon the goal of maintaining a given system in an exact, unchanged, permanent state for purposes having nothing to do with biodiversity or ecosystems, while the latter embraces the dynamic nature of ecosystems and the natural disturbance processes and successional stages that provide the range of natural habitats needed to maintain the complete range of native biodiversity (Thompson et al. 2009). Under the ecological definition of "resilience", natural disturbance processes like tree mortality from competition and native bark beetles, and wildland fire, are essential occurrences that create and maintain the various habitat types needed to maintain viable populations of the plant and wildlife species native to fire-adapted conifer forest ecosystems. Ecological resilience, in fact, is defined by the maintenance of the full complement of biodiversity native to the ecosystem, and the ecosystem is not defined by only one vegetation type (Thompson et al. 2009). For example, in fire-adapted conifer forest ecosystems, mixed-intensity wildland fire is a natural part of fire regimes (see below), and many plant and animal species depend upon the unique montane chaparral and snag forest habitats created by patches of high-intensity fire (where most or all trees are killed), and pockets of tree mortality from beetles or other natural factors. Thus, the natural early-successional habitat created by high-intensity fire patches (e.g., snag stands and montane chaparral) or insects is as much a part of the forest *ecosystem* as the unburned stands of live green trees (Thompson et al. 2009, Swanson et al. 2010). If it is the Forest Service's intention to promote engineering resilience, to the detriment of native biodiversity and natural ecological disturbance processes, rather than ecological resilience, which would benefit native biodiversity, the Forest Service must be clear about this and the adverse impacts of it.

Misrepresentation of Data on Historic Fire Intensity

The SN asserts or implies that patches of high-intensity fire (generally termed "high-severity fire" by the Forest Service), wherein most or all trees are killed within a mosaic of low- and moderate-intensity fire effects, is "damaging" to forest ecosystems and implies that such fire is unnatural. This is flatly inaccurate. The scientific evidence is clear that, historically, prior to fire suppression and logging, mixed-conifer and ponderosa/Jeffrey-pine forests experienced a mix of low, moderate, and high-intensity fire effects in the Klamath, dry Cascades forests, and Sierra Nevada and nearby forests (Leiberg 1900, Leiberg 1902, Minnich et al. 2000, Beaty and Taylor 2001, Bekker and Taylor 2001, Nagel and Taylor 2005, Hessburg et al. 2007, Bekker and Taylor 2010, Collins and Stephens 2010), and high-intensity fire was always a natural part of historic fire regimes. With regard to high-intensity fire proportion (the average percentage of high-intensity effects, relative to low- and moderate-intensity), Hessburg et al. (2007), using early 20th-century aerial photos to reconstruct pre-1900 (pre-suppression/pre-logging) forest structure and fire regimes, concluded that, in pre-management forests of the eastern Cascades, "stand replacement effects were more widespread in patches than surface fire effects" in moist mixed conifer forests, and high-intensity fire represented about 1/3 of dry mixed conifer forest. Hessburg et al. (2007) concluded that "evidence for low severity fires as the primary influence, or of abundant old park-like patches, was lacking in both the dry and moist mixed conifer forests". Rather, the authors found "widespread evidence of partial and stand-replacing fire", indicating that "non-equilibrium patch dynamics were primarily at work". Collins and Stephens (2010) found that reference mixed-conifer and white fir forests in Yosemite National Park (forests that had never been logged, and had continued to experience frequent fire—i.e., had not missed fire return intervals) had an average of 15% high-intensity fire effects, and most of the high-intensity fire area was comprised of patches hundreds of acres in size. Collins and Stephens (2010) concluded that "stand-replacing patches should be considered an important component shaping these forests". In mixed-conifer and ponderosa/Jeffrey-pine forests of Baja California that had never been subjected to logging or fire suppression, Minnich et al. (2000) found that the average high-intensity fire proportion was about 17% (52-year overall fire rotation interval and 300-year high-intensity fire rotation interval). Beaty and Taylor (2001 [Table 8]) found historic high-intensity fire proportions of 18-70%, depending on slope aspect, in mixed-conifer and fir forests of an unmanaged area of the Lassen National Forest. Bekker and Taylor (2001 [Fig. 2f]), in a different unmanaged mixed-conifer and fir forest on the Lassen National Forest, found historic high-intensity fire proportions of about 50-65%. Bekker and Taylor (2010) found that, in an unmanaged area of the Lassen National Forest within mixed-conifer forests, the fires burned mostly at high-intensity historically, with some high-intensity fire patches being thousands of acres in size. Bekker and Taylor (2010) concluded that "high-severity fire was important in shaping stand structure" historically. Leiberg (1902) mapped large expanses of high-intensity fire prior to fire suppression in the Sierra Nevada, with some individual patches exceeded 10,000 acres in size in areas mapped as unlogged by Leiberg. Moreover, these data indicate that, historically, the rotation intervals for high-intensity fire in mixed-conifer and ponderosa/Jeffrey-pine forests were about 150-350 years in length, if the proportion of high-intensity fire effects and the overall fire rotation, or the proportion of the area affected by high-intensity fire over time, are used to calculate high-intensity fire rotations (Minnich et al. 2000, Beaty and Taylor 2001, Bekker and Taylor 2001, Bekker and Taylor 2010, Collins and Stephens 2010). Even under the broadest possible definitions of "high-severity" or "high-intensity" fire, the current high-intensity fire rotation intervals in the Sierra Nevada are at least 500-1000 years long (annual average of 15,000 to 20,000 acres of high-intensity fire in the 12 million acres of Sierran forests).

Misrepresentation of Stand Density Issues

The SN cryptically implies that, due to insects and competition between trees, stand density must be substantially reduced supposedly in order to improve the *ecological* health of the forest. No citation to any scientific document is provided by the SN to support this statement or explain why some additional snag recruitment would have an overall negative impact on native biodiversity; nor does the Franklin and Johnson (2009) report provide any such citations or ecological basis. Moreover, the SN fails to describe the levels of basal area mortality that would likely occur under no action, and how or why additional medium and large snags would be undesirable ecologically. The SN misrepresents the data and presents it in a seriously misleading fashion, implying that high, and ecologically undesirable, levels of tree mortality will occur if intensive commercial thinning, as proposed, does not occur. This is flatly erroneous.

Oliver (1995) found that, as relatively young ponderosa pine stands reached Stand Density Index (SDI) levels from 300 to 365, beetle mortality reduced stand density by only about 13-20%. Mortality was **near zero** when SDI values were below 230 (Fig. 2 of Oliver 1995). Further, despite modest mortality as stands neared SDI of 365, the stands ultimately continued to grow more mature and more dense, reaching an SDI of 571 finally (Fig. 1 A-C of Oliver 1995).

Oliver (2005) found that the very densest pine plots increased to a basal area of 175 square feet per acre, and an SDI of around 350, and then experienced beetle mortality of only 17% of the basal area (down to about 145 square feet per acre). In the ponderosa pine plots in California, the densest plots increased to a basal area of about 220 with almost no beetle mortality after the stands reached about 85 years of age (Oliver 2005, Fig. 1). The stands in the Project area are over 85 years of age. Oliver (2005) noted that mortality levels have "declined over the years" in the eastside ponderosa pine forests as these forests have grown older and denser.

Further, the Cochran and Barrett (1995) study investigated pine stands and found that, even at higher SDI levels, "there was no apparent correlation between stand density and mortality" (see p. 9 of Cochran and Barrett 1995). In that study, the highest annual growth rates were at SDI values **over 200** (Figs. 14, and 18-20 of Cochran and Barrett 1995). The maximum basal area mortality of any plot (i.e., not the average) was only 29% over 30 years (about 10% in a given decade—much less than decadal growth), and most plots had far, far less mortality than this. The "high" mortality rates in Cochran and Barrett (1995) were only about 5-10% of the basal area and less than 5% of the SDI for the very densest plots (Figs. 1 and 2 of Cochran and Barrett 1995).

Similarly, Cochran and Barrett (1999) found essentially the same thing as Oliver (2005), discussed above. The study found that, once ponderosa pine stands became older than 85 years of age (like those in the Project area), mortality from beetles dropped to nearly zero even at SDI values of 250-300 (see Fig. 3 and Table 3 of Cochran and Barrett 1999). Even when the stands in this study area were younger, as they were when studied by Larsson et al. (1983), the mortality levels from beetles were still relatively modest for stands with basal areas over 150 square feet per acre (i.e., a minority of the total stand basal area).

Cumulative Impacts on Cavity-nesting Wildlife Species

Given that the SN's proposal to substantially reduce stand densities would greatly reduce or essentially halt future recruitment of large snags (reducing future tree mortality to very low levels), or substantially reduce future large snag recruitment levels relative to no action, as discussed in the section immediately above, densities of large snags (generally, snags over 15 inches dbh, and preferably over 20 inches dbh) in future decades will necessarily be reduced relative to current levels, as attrition of currently-standing snags occurs. The SN does not adequately analyze the impacts that this would have on cavity-nesting wildlife species, including Sensitive Species and Management Indicator Species, such as the spotted owl and Black-backed Woodpecker and Hairy Woodpecker.

No Rational Connection Between the Facts, the Purpose and Need, and the Proposed Action

The SN does not clearly establish that the basal area mortality of conifers that would result from the combined thinning (killing of trees via chainsaws) and fire/insect mortality would be less than the basal area mortality that would result from fire or insect mortality alone, or from fire and insect mortality that would likely result after implementation of a non-commercial alternative (e.g. 10-12" or 16" diameter limit); nor does the SN establish that, after implementation of the proposed action, the project area would have adequate and ecologically-healthy levels of large snags and large downed logs for wildlife, as discussed below.

Black-backed Woodpecker

The SN does not divulge the potential adverse impacts of the Project on the Black-backed Woodpecker, which is a bellwether species for wildlife species associated with snags in heavily burned forest. This habitat type is very ecologically important, and supports high levels of native biodiversity (Swanson et al. 2010). The Project would affect Black-backed Woodpeckers for two reasons. First, recent science shows that pre-fire logging, consistent with the type of mechanical (commercial) thinning proposed in this Project, substantially reduces habitat suitability for Black-backeds even if the affected area later burns in a wildland fire, likely due to reduced potential densities of large snags upon which the birds forage (Hutto 2008, Hutto and Hanson 2009). Second, the Project SN indicates that the Proposed Action would significantly reduce the potential for moderate or high-intensity fire in the thinned areas. Black-backeds depend upon areas burned at higher fire severities (Hutto 2008). Unless steps are taken to ensure that significant habitat is created and allowed for this species in the project area, the Project could threaten the viability of the Black-backed Woodpecker by further reducing potential habitat across the landscape, thus violating the forest plan's requirement to ensure viability. The agency has not provided information showing the quantity and quality of habitat necessary to ensure viable populations of Black-backed Woodpeckers within the planning area, including the minimum viable population threshold and the minimum threshold amount of suitable habitat necessary to support minimum viable populations. Without this information, the agency cannot ensure the viability of this species.

Spotted Owl

The SN does not adequately analyze the fact that recent research reveals that Spotted Owls preferentially select unlogged high-intensity fire patches for foraging, while selecting unburned or low-severity areas for roosting (Bond et al. 2009). High-intensity fire patches enhance habitat (e.g., montane chaparral, large downed logs, snags) for the Spotted Owl's small mammal prey species (Bond et al. 2009). The most recent scientific evidence makes clear that Spotted Owls benefit from natural heterogeneity created by patches of high-severity fire—habitat that is not mimicked by logging. Bond et al. (2009) indicates that unlogged patches of high-intensity fire comprise a newly discovered category of suitable habitat for Spotted Owls. It is no longer scientifically defensible to simply cite to previous studies which did NOT investigate whether burned forest was suitable for Spotted Owls in order to arbitrarily define suitable Owl habitat in a way that includes only unburned forest, and ignores important new scientific findings.

Scientific evidence regarding Spotted Owls in northwestern California and in Oregon found that positive trends in survival and reproduction depended upon significant patches of habitat consistent with high-severity post-fire effects (e.g., montane chaparral patches, snags, and large downed logs) in their territories because this habitat is suitable for small mammal prey species of the owl, including the Dusky-footed Woodrat (Franklin et al. 2000, Olson et al. 2004). This habitat is not mimicked by logging as proposed by this project, which does not create an abundance of snags and large downed logs, and which seeks to reduce shrub cover. If your stated project objectives are achieved, you could not only render thousands of acres of spotted owl habitat unsuitable or marginally suitable in the present and near-term, but could also reduce survival and reproduction by preventing occurrence of natural post-fire habitat heterogeneity in the spotted owl territories.

Cumulative Impacts and Thinning "Effectiveness"

Recent research provides evidence that seriously questions the very basis for thinning and its assumed effectiveness. Rhodes and Baker (2008) found that, based upon the fire rotation interval for high severity fire, and assuming an effectiveness period of 20 years for a mechanically-thinned area (i.e., before it would need to be treated again to maintain effectiveness from a fire/fuels perspective), the probability of a thinned area encountering a high severity fire patch during the 20-year effectiveness period (assuming for the sake of argument that the thinning actually does reduce fire severity during this period) is only about 3.3% in California's forests. It would be less than 2% if an 11-year thinning effectiveness period is assumed (Rhodes and Baker 2008). This means that, in order to have a 50% chance of having the thinned area reduce the severity of a fire patch that would have otherwise been high severity, the thinned area would have to be re-thinned every 20 years for about 300 years (see Rhodes and Baker 2008). Please fully analyze the implications of this new data, and please also fully divulge whether you intend to re-thin this area over and over again every couple of decades or so for the next three centuries or so in order to have a reasonable probability of having the thinning area ACTUALLY prevent high severity fire from occurring in the thinned area. If so, please fully analyze the cumulative environmental impacts on wildlife, soils, and watersheds from such repeated mechanical activities on this site. If not, please divulge the fact that the probability that the thinned area will NOT encounter a high severity fire area is about 97% or greater, and that your thinning activities are <u>extremely unlikely</u> to be effective in any tangible or meaningful way for fuels/fire management.

<u>Purpose and Need</u>

The SN suggests that a key objective of the proposal is to prevent patches of high-intensity fire from occurring ostensibly to prevent damage of some type. However, the SN does not adequately explain the ecological damage sought to be avoided, nor does it explain or divulge the damage to wildlife species that would occur from preventing high-intensity fire patches from occurring, or divulge the fact that many forest species benefit from and depend upon such high severity fire patches.

The SN states that a key objective is to reduce future mortality of trees ostensibly in order to benefit the forest. However, the SN does not explain the ecological damage that large snags supposedly cause in the forest, and fails to divulge the damage that would be caused to numerous forest species if large snag levels are reduced further from current levels due to stand density reduction, reduction in competition between trees, and resulting lower levels of large snag recruitment in future years and decades.

<u>Ecological Importance of Mixed-intensity Fire, Including High-intensity Patches</u>

The SN implies, incorrectly, that high-intensity fire is unnatural and wholly harmful in mixed conifer forests. The U.S. Forest Service recently began a study of avian diversity and abundance in unburned areas and in three large recent fires, including the Moonlight and Storrie fires that some have inappropriately described as "catastrophic". This study, conducted by PRBO Conservation Science, found that nest density increased with increasing proportions of high-intensity fire (with the highest nest densities occurring in 100% mortality areas), and that total bird abundance was the highest in the high-intensity areas of the Storrie fire of 2000 (where shrubs had fully matured, and some snag attrition had occurred, creating important downed log structure)—higher than the unburned mature forest in the same area (USDA 2010). The report concluded:

"It is clear from our first year of monitoring three burned areas that post-fire habitat, especially high severity areas, are an important component of the Sierra Nevada ecosystem…post-fire areas are not catastrophic wastelands; they are a unique component of the ecosystem that supports a diverse and abundant avian community…"

USDA (2010 [pp. 9-41]).

Other recent data reveals that high-intensity fire patches can result in highly beneficial ecological effects to riparian zones and watersheds by causing an increase in invertebrate prey and dissemination of such riparian invertebrates to the terrestrial landscape (Malison and Baxter 2010).

Wildland fire remains heavily suppressed currently relative to pre-suppression annual extent (area) of burning in forests of California and the western U.S. in general, with current levels being about one-tenth of pre-suppression levels of annual burning (Medler 2006, Stephens et al.

2007). Fire at ALL levels of intensity, including high-intensity fire, are in deficit currently relative to pre-suppression times (Hanson 2007). Numerous high-intensity patches prior to fire suppression were hundreds or thousands of acres in size (Leiberg 1900, Bekker and Taylor 2010, Hanson 2007, Fig. 3.1). In the Lake Tahoe Basin, for example, montane chaparral has declined by 62% since the 19th century due to the reduction in high severity fire occurrence, creating a significant concern about the plant and animal communities that depend upon post-fire montane chaparral (Nagel and Taylor 2005). The SN fails to acknowledge that patches of high-intensity fire are natural in these ecosystems, and that many plant and animal species depend upon such habitat (Hanson 2007, Hutto 1995, Hutto 2006, Noss et al. 2006). In fact, peak levels of native diversity in higher plants and wildlife species is found in patches of conifer forest burned at high severity which have not been managed (logged) (Noss et al. 2006). Please explain your suggestion that wildland fire is an ecological threat in light of this information.

Historical Data

The SN implies that stands were substantially less dense historically in the Project area. Please explain your scientific basis for this.

Removal of Mature Trees is Unnecessary for Fire/Fuels Management

The SN asserts or implies that intensive mechanical thinning up to 30" dbh is necessary to reduce potential for severe fire. However, recent scientific studies have found that precommercial thinning of sapling and pole-sized trees only (up to 8-10 inches in diameter) effectively reduces fire severity. See, for example:

a) Omi, P.N., and E.J. Martinson. 2002. Effects of fuels treatment on wildfire severity. Final report. Joint Fire Science Program Governing Board, Western Forest Fire Research Center, Colorado State University, Fort Collins, CO. Available from http://www.cnr.colostate.edu/frws/research/westfire/finalreport.pdf (found that precommercial thinning of trees under 8 to 10 inches in diameter reduced potential for severe fire (email communication with the authors confirmed that trees removed were of this small size class)). More specifically, the Omi and Martinson (2002) study, found that precommercial thinning reduced stand damage (a measure of fire severity generally related to stand mortality) in both of the two thinned study sites, Cerro Grande and Hi Meadow (the authors reported that the Hi Meadow site was marginally significant, $p<.1$, perhaps due to small sample size), each with several plots.

b) Martinson, E.J., and P.N. Omi. 2003. Performance of fuel treatments subjected to wildfires. USDA Forest Service Proceedings RMRS-P-29 (found that non-commercial thinning of submerchantable-sized trees, generally followed by slash burning or removal, in several areas across the western U.S. greatly reduced fire severity, and that this result held true regardless of post-thinning basal area density).

c) Strom, B.A., and P.Z. Fule. 2007. Pre-wildfire fuel treatments affect long-term ponderosa pine forest dynamics. International Journal of Wildland Fire **16**: 128-138 (non-commercial thinning of very small trees under 20 cm dbh (8 inches dbh) in seven different sites dramatically reduced fire severity, resulting in post-fire basal area mortality of only about 28% (low severity) in non-commercially thinned areas versus post-fire basal area mortality of about 86% in untreated areas).

Sincerely,

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<u>Additional References</u>

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